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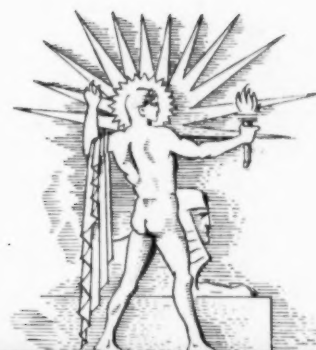
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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE.



July 25, 1942

Scientists of Tomorrow

See Page 54

A SCIENCE SERVICE PUBLICATION

Do You Know?

Spring burning of pasture land damages grass and timber, destroys soil fertility and starts erosion, according to forestry experts.

"Fiddlesticks," air pressure gauges for quickly checking pressure of tires, are carried by army officers in the manner of a swagger stick or riding crop.

Pomades to prevent chapping of lips and face may soon be put up in lipstick-like cases for soldiers stationed in cold climates, if present experiments warrant their use.

Helmholtz in 1881 showed that the force of attraction between the oxygen and hydrogen atoms in a molecule of water is 21 billion times the force of gravitation.

As the war is creating a shortage of fish liver oils, livestock farmers and poultrymen are depending more and more upon alfalfa meal, kale, yellow corn, and carrots for needed *vitamin A*.

American Indians, for whom dried beef and dried vegetables have long been staple foods, are helping the U. S. Department of Agriculture develop improved ways of *food dehydration* for wartime use.

Recent experiments with *bean* plants showed that yields of beans were improved when one-fourth or even one-half of the leaves of the plants were removed at certain periods during the growing season.

Question Box

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PSYCHOLOGY

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Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

The heaviest *bird mortality* occurs within two days after leaving the nest, some authorities estimating it to be as high as 50%.

Not only does the *cucumber beetle* feast destructively upon cucumber, muskmelon, squash, and pumpkin; it also spreads bacterial wilt and mosaic disease.

Scales which are accurate within 40 billionths of a pound are used to measure the tungsten filament wire of electric lamps.

Lemurs, more primitive than other primates, are believed to be relatively unmodified descendants of one of man's early ancestors.

SCIENCE NEWS LETTER

Vol. 42 JULY 25, 1942 No. 4

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N. W., Washington, D. C. North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$7.00 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

In requesting change of address, please give your old address as well as the new one, at least two weeks before change is to become effective.

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Cable address: Scienservice, Washington.
New York office: 310 Fifth Avenue, CHickering 4-4565.

Entered as second class matter at the post-

office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

The Science Observer, established by the American Institute of the City of New York, is now included in the SCIENCE NEWS LETTER.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland Inc., 393 7th Ave., N. Y. C., PENnsylvania 6-5566; and 360 N. Michigan Ave., Chicago, STate 4439.

SCIENCE SERVICE is the Institution for the Popularization of Science organized 1921 as a non-profit corporation.

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GENERAL SCIENCE

Twenty Scholarship Winners Chosen for Science Talent

Farmingdale, N. Y., Girl and Shorewood, Wis., Boy Get \$2,400 Westinghouse Grand Science Awards

TOP HONORS in the Science Talent Search conducted by Science Clubs of America went to Marina Prajmovsky, 18, of Farmingdale, N. Y., and to Paul Erhard Teschan, 18, of Shorewood, Wis., a Milwaukee suburb.

Each won a \$2,400 Westinghouse grand science scholarship to be used during four years of college work. The nationwide competition was held under sponsorship of Science Service.

To three other girls and 15 other boys went Westinghouse science scholarships of \$200 each. (See page 54 for list.)

Marina

Marina Prajmovsky is a native of Finland and is of Russian parentage. She has lived in this country since the age of four. Marina already has enrolled in summer courses at New York University where she is studying to be a medical technician. She has spent two years

working on her own experiments in the field of osmosis. For one year she planned experiments and studied nerves in frogs and rats. She has built her own equipment for her experiments, including electric needles for nerve study.

Marina was president of Farmingdale High School biology and debating clubs and was valedictorian of her class of 108 students which graduated in June. She also took active part in algebra, French, Latin and library clubs. Her hobbies are collecting butterflies and writing poetry. Marina already had won an advanced physical science prize and an oratorical medal in high school.

Paul

Paul Erhard Teschan is 5 feet 10 inches tall and weighs 145 pounds. He will enter Carleton College, Northfield, Minn., in September and plans to be a chemist, specializing in pathology. He

GRAND AWARD

The \$2,400 Westinghouse Grand Science Scholarship Award is being handed to Marina Prajmovsky by A. W. Robertson, Chairman of the Board of Westinghouse Electric and Manufacturing Company, as Paul Teschan, also a grand award winner looks on. Also shown in the picture are (at left) Dr. Harlow Shapley, Rear Admiral H. G. Bowen, and Watson Davis.

is the son of Lieut.-Col. E. G. Teschan, a former Milwaukee business man now on foreign duty with the Army. Paul is a major in the war messenger corps in his community. He won his school letter in athletics at Shorewood High School and was valedictorian of his graduating class of 232 students, with a straight "A" average. A recital of his arrangement of "The Erl-King" was given by the high school glee club. Paul's school record shows that he was equally at home in devising his own experiments and in working out science projects with others. In group work, he prepared and gave demonstrations of scientific processes and built experimental apparatus. He took active part in the school science, mathematics and glee clubs and in the chorus. He had previously won a scholarship to Carleton College. The Westinghouse scholarships were awarded without regard to which college the winners will attend.

Award of the scholarships climaxed a three-day Washington trip in which 40 boys and girls took part. Announcement was made at a dinner at which Rear Admiral Harold G. Bowen, Director of the Naval Research Laboratory, and A. W. Robertson, Chairman of the Westinghouse Electric & Manufacturing Company, spoke. Watson Davis, Director of Science Service, presided.

All Passed Tests

All 40 winners in the Science Talent Search trip to Washington passed stiff aptitude tests to qualify, and over half of them were at the head of their high school graduating classes. Essays which they wrote on how science can help win the war are being published in book form by Science Service and Penguin Books (25c) under the descriptive title

"Youth Looks at Science and War."

More than 10,000 high school seniors, in every state in the Union, entered the First Annual Science Talent Search competition. Science Clubs of America, which conducted it, is a group of 1,050 science clubs in schools, sponsored by Science Service. The Westinghouse Electric & Manufacturing Company, as a means of developing interest among American youth in science, made possible the trips to Washington by the 40 winners and provided the scholarship awards, which totaled \$8,400. Examining judges in the contest were Dr. Harlow Shapley, Director of the Harvard Observatory, Dr. Stuart Henderson Britt, of the National Research Council and Dr. Harold A. Edgerton of Ohio State University.

Science News Letter, July 25, 1942



AT CAPITOL

The winners were photographed with Vice-President Wallace. They are (sitting) Paul Erhard Teschan, Betty-Jane Jones, Robert Lee Lynch, Marina Prajmovsky, Nathaniel Herbert Halberstadt, Jean Carol Ross, Paul Joseph Barthel, Paul Winsor, III, Paul Frederic Craneheld, Jr., Julia Anne Wien. Next row: Seymour Linder (extreme left) Robert Edward Phillips, Clifford Edward Swartz, Beatrice Meiowitz, Richard M. Hoover, Vice-President Henry A. Wallace, Carol Ruth Pike, Jack Eugene Presberg, Robert Greiff, Allan Earl Voigt, William Dorrance Worthington. Three at extreme right: Janet Mary Jacobson (behind William Worthington) Barton Brown, Mary Ann Williams. Next row: Homer Frederick Davis (at right of Robert Phillips) Gilbert Christopher Dehnkamp, Joseph Livingstone Ousley (left of Vice-President) Eugene Attilio Avallone, Donald Robertson White, John William Michener, Robert Eugene Kofahl, Wayne Homer Larrimore, (behind Jack Presberg) William Denman Calhoun, Evelyn Alice Pease, James Newell. Back row: Wolf Karo (behind Gilbert Dehnkamp), Hugo Korn, Lester Blessing Hollander, Harlan James Smith and Warren Thomas Borgeson.

"In our preoccupation with material supplies for our war effort, we must not forget that an intelligent, thinking populace, democracy's saving grace in peacetime, is the source of its irresistible will to victory and freedom in wartime. Habits of clear thinking, of discarding that which is not founded on fact, and of reasoning logically through a problem, may well fill the breach between our material front and that of our great ideals. Although abstract in nature, the value of this front of attack to national morale cannot be overestimated."—From the essay of Paul Erhard Teschan.

GENERAL SCIENCE

Scholarship Winners Told Beware of Bumptious Vanity

By DR. HARLOW SHAPLEY

Harvard College Observatory

Three DON'TS from remarks made at the First Annual Science Talent Search Dinner.

DON'T, because of this apparent success get vain or bumptious, because in my experience the mortality among vain and conceited young scientists is very high. In the first place many perish in the hands of the fool killers that lie in wait on all sides. A number perish because colleagues can stand only so much. And, third, most of these vain young scientists perish as scientists through becoming smothered in their own petty vanities and introspections. Rarely do you find first class scientists who are unbecomingly vain. Humility is the normal asset.

Don't forget that this distinction of being a winner in the Science Talent Search should be a source for sympathy, rather than for congratulations because upon you heavy responsibility has been placed. You have no escape now from the necessity of hard work, persistent thinking, and sincerity in scientific activity. We expect great things of you.

Don't take the actual winning of scholarship money as very important so that it sets you up above those who were not selected, because all it means is chiefly that it will help make it possible for your Dads to get back to smoking cigars instead of a pipe while Dads of those who did not win may have to stay with the old corncob longer.

Science News Letter, July 25, 1942

"One of the most important factors both in defense and in offensive action is protection against injury and disease. Not only are effective medical and surgical measures valuable in relieving suffering and in enabling the wounded to return to duty in a minimum length of time, but every hour that we allow illness to steal from our laborers is a proportional loss in vital materials. Although considerable progress has recently been made in medicine, additional research, especially in the new techniques of chemotherapy, will probably play an important role both in the war itself and in the post-war reconstruction."—From the essay of Marina Prajmovsky.

GENERAL SCIENCE

Scientists Fight the War, Says Westinghouse Head

By A. W. ROBERTSON

Chairman of the Board, Westinghouse Electric and Manufacturing Company

Excerpts from address made at the First Annual Science Talent Search Dinner.

WE THINK of war as being fought with tanks, bombers, aircraft and battleships. But in another sense it is being fought in the scientific laboratories of the country.

Scientists are more interested in war than most citizens. Science thrives best in a peaceful society of free men. Our brothers and fathers are fighting this war to preserve scientific activities as well as to save our lives, our property and honor.

America is about the last country in which a meeting of young science students could be held; either fear or governmental orders would prevent such meetings elsewhere.

In a sense, this war is fought by scientists. Men of science invented and perfected every weapon of both aggressor and defender. It is developing into a war of the scientific specialist—the odds favor the side with the best scientists. It might be thought that science debased itself by thus becoming the handmaid of war. But the fact is, we either win the war or scientific activities will suffer a major eclipse.

Science News Letter, July 25, 1942

MILITARY SCIENCE

Radio Detectors, New Engines, Product of Navy's Research

Director of Naval Research Laboratory Tells Search Dinner of Achievements of Science in Fighting War

By Rear Admiral H. G. Bowen

Director, U. S. Naval Research Laboratory.

Address at the First Annual Science Talent Search Dinner

AT THE time of the last war the research laboratories which existed in this country were relatively few and small. The Navy Department was assisted by the Naval Consulting Board of which Thomas A. Edison was the Chairman. This Board mainly handled inventions, and its report is a very interesting document to read today because it reveals very clearly the confused state of mind in regard to research, engineering developments, engineering testing, and inventions. I am sorry to say that there has not been too much improvement since that time in the proper understanding of the concept embodied in these operations.

One of the most important results of the Naval Consulting Board in which the then Secretary of the Navy, the Honorable Josephus Daniels, concurred heartily, was its decision to establish a Naval Research Laboratory. The Laboratory was not established until 1921 due to the unwillingness to start another activity which could not possibly contribute to the war then in progress. A wise remark of the Naval Consulting Board was, "One of the great virtues of the Naval Research Laboratory is that there would be developed during peacetime a corps of technically trained men who would be familiar with Naval affairs and the present state of development of the arts used in warfare whenever war occurred. They would be able immediately to direct their attention and that of civilian assistants to the operation of war devices. Its technical personnel would be the nucleus for mobilization of scientists for war."

We thus see that in the period under discussion the various phases which must be undertaken before a new product can be launched were not clearly understood, that there was relatively little research

going on in this country, and that research did not play a large part in the war of 1917-18 as far as the United States was concerned. The research situation in Germany at this time was completely different. The Allies were very much impressed by the progress of organized research in Germany, and two of the Allies at least, the United States and Great Britain, subsequently profited by the German demonstration of the importance of research.

Research from 1918 to 1941

The development of commercial research in the United States and Great Britain naturally followed different lines due to certain intrinsic differences which exist in the two countries. In this country we have a tremendous domestic consumption which not only warrants but supports mass production. One of the many by-products of mass production is the commercial research laboratory. The rise of the great commercial laboratories since the last war has been truly phenomenal and they have played a tremendous influence in the scientific, the commercial, and the economic field. The commercial research laboratory probably represents the first time in the history of civilization that any art has been self-supporting. The great progress in the United States in engineering has been due to its commercial research laboratories. The commercial research laboratories and industry together have been responsible for placing more men at work than any other influence or agent except the National Government.

Great Britain with a much smaller population and therefore a much smaller domestic market has never approximated the United States in the full utilization of mass production. Research there has been more often associated with manufacturers associations and Government-aided activities.

During the same period, on July 2, 1923, the Naval Research Laboratory was formally opened. In the words of Congress: "for laboratory (*Turn to page 60*)

GENERAL SCIENCE

Westinghouse Science Scholarship Winners**GRAND SCHOLARSHIPS OF \$2,400**

Prajmovsky, Marina, Farmingdale, N. Y.
 Teschan, Paul Erhard, Shorewood, Wis.

ALTERNATES

Meirowitz, Beatrice, New York, N. Y.
 Smith, Harlan James, Wheeling, W. Va.

SCHOLARSHIPS OF \$200

Jacobson, Janet Mary, Oak Park, Ill.
 Meirowitz, Beatrice, New York, N. Y.
 Ross, Jean Carol, Hammond, Ind.
 Borgeson, Warren Thomas, Park River, N. D.
 Brown, Barton, Sea Cliff, N. Y.
 Craneheld, Paul Frederic, Lakemills, Wis.
 Davis, Homer Frederick, Frewsburg, N. Y.
 Halberstadt, Nathaniel Herbert, Floral Park, N. Y.
 Larimore, Wayne Homer, St. Paul, Minn.
 Michener, John William, Pittsburgh, Pa.
 Newell, James, Salem, N. J.
 Ousley, Joseph Livingstone, Freeport, Ill.
 Presberg, Jack Eugene, Rochester, N. Y.
 Smith, Harlan James, Wheeling, W. Va.
 Swartz, Clifford Edward, Niagara Falls, N. Y.
 White, Donald Robertson, Schenectady, N. Y.
 Winsor, Paul, III, Boonton, N. J.
 Worthington, William Dorrance, Camden, N. Y.

ALTERNATES

1st—Williams, Mary Ann, Troy, N. Y.
 2nd—Pike, Carol Ruth, New York, N. Y.
 1st—Hoover, Richard M., Kansas City, Kan.
 2nd—Voigt, Allan Earl, Salem, Ore.
 3rd—Avallone, Eugene Attilio, New York, N. Y.
 4th—Phillips, Robert Edward, Glendale, Calif.
 5th—Barthel, Paul Joseph, Evansville, Ind.

(For school affiliation, see SNL, June 27)

GENERAL SCIENCE

Top Winners of Search Shown on Front Cover**See Front Cover**

THE FRONT cover of the SCIENCE NEWS LETTER this week shows the top winners of the first Science Talent Search. Top row: Paul Erhard Teschan and Marina Prajmovsky, winners of Grand Scholarships of \$2,400. Lower: Beatrice Meirowitz and Harlan James Smith, alternates for the Grand Scholarships.

In case the winners, through illness or other cause cannot use the grand scholarships, they will be given to the alternates. Otherwise the alternates receive the \$200 scholarships.

Science News Letter, July 25, 1942

PSYCHOLOGY

How Science Talent Winners Were Chosen Told by Judge**Aptitude Test, Recommendations, Scholarship, Essay, and Interviews Were Hurdles Used**

By **DR. HAROLD A. EDGERTON**

Director, Occupational Opportunities Service, The Ohio State University

IN SETTING up the procedure for selecting the winners in the First Annual Science Talent Search, several questions needed to be considered: What kind of people should be selected? Were the techniques such as could be administered in the local schools? Would they lend themselves to fairly objective treatment? Were they such that the cost of dealing with the materials would not be prohibitive in terms either of time or labor?

In order to accomplish this, the kinds of people who should have the scholarships were considered. While there has been the classic picture of the scientist as a "lone wolf," a modern version is an individual able to think for himself, to lead others, and to work cooperatively. A scientist must be a well-rounded human being.

Well-Rounded Scientist

First, boys and girls capable of going ahead in science should be very bright. They should have some background in science. There should be evidence of strong interest in science, in terms of their hobbies and out-of-school activities. They should be socially competent.

For administrative purposes, it was decided to use the successive hurdles technique. By this is meant that all candidates would expose themselves to the first hurdle. Some would survive this hurdle and some would not. Those who survived the first hurdle would then expose themselves to the second hurdle. Those who survived the second hurdle would then go on to the third hurdle, and so on until only the scholarship winners remained. Such a method has its maximum validity only when the successive hurdles are applied in decreasing order of validity.

The successive hurdles were as follows:

(1) A science aptitude test. This test was a paragraph reading test, materials

for which were drawn entirely from fields of science. Such a test should select those who have the aptitude to study science in colleges and universities, but does not place a heavy premium on previous knowledge of science.

(2) High school record. The high school furnished a transcript of his high school record for each contestant, including a statement of his rank in the senior class and the number in the senior class.

(3) A recommendation blank for every contestant was filled out by members of the high school faculty. This record blank asked for information in regard to various traits: attitude, purpose, ambition, science aptitude, work habits, resourcefulness, social skills, cooperativeness, initiative, responsibility, mechanical ability, special abilities, and others. The recommendations gave specific evidence of what the contestant had done or failed to do by which his competence in the trait had been judged.

(4) Each contestant was required to submit an essay of not more than 1000 words on the subject "How Science Can Help Win the War."

Use of Hurdles

These hurdles were used in the order listed above. The science aptitude test was scored on the basis of the number of items correct. Each question was so arranged that only one answer could be considered the best or correct answer. It was agreed that the ratio of boys and girls throughout the contest would remain constant and equal to the ratio of boys and girls who entered the contest. This essentially made two contests.

The 600 boys and girls obtaining the highest scores on the aptitude test were the survivors of the first hurdle. These 600 were then exposed to the second hurdle.

The second hurdle was a combination of rank in high school class and amount of science taken, weighting the quality of work done (rank in class) five and amount of science taken, one. On the basis of this combined score, 300 were retained, still keeping the ratio of boys



OPENING EXERCISES

Presiding when the winners were welcomed to Washington and were given their final written examination were: Dr. Stuart Henderson Britt (left), Dr. Harold A. Edgerton, Dr. Alexander Wetmore, Assistant Secretary of the Smithsonian Institution in Charge of the National Museum, and Dr. Harlow Shapley. In the background is Watson Davis.

to girls constant. Of these 300, 66 were girls and 234 boys. These 300 were then exposed to the third hurdle.

The third hurdle was the score derived from the recommendation blanks. Each item of the recommendation blank was scored either one or zero, indicating respectively good evidence of high standing in a trait or little or no evidence of high standing in a trait. Each item was scored independently by two judges. The amount of agreement between the two judges was high. On the basis of this score, the 117 highest boys and 33 highest girls were said to have survived the third hurdle.

To complete the fourth hurdle, the essays were considered. These essays were read by members of the staff of Science Service. Three raters judged the essays for the girls and 4 raters judged the essays for the boys, each rater giving a score of *good*, *fair*, or *poor* to each essay submitted.

In choosing the 40 trip winners from the 150 survivors of the third hurdle, the score on the essay and all of the previous evidence was considered. On this basis, the 40 winners, 9 girls and 31 boys, were invited to Washington.

The fifth and last hurdle applied to the 40 trip winners, survivors of four

previous hurdles, included two new sources of information about each contestant. The larger part consisted of the judgments of three interviewers. The interview was standardized, aimed primarily at exploring breadth of background of the contestant; how well his background fitted him for preparing for a career in science; and how strong a drive each seemed to have toward a career in science. Each contestant was interviewed separately by three interviewers. (The other interviewers were Dr. Stuart Henderson Britt and Dr. Harlow Shapley.) After finishing the interview, the interviewers made their ratings of the contestant before going on to the next interview.

A test designed to judge the clarity of thinking of the 40 trip winners, in regard to social situations, was also administered.

The scholarship winners among the 40 were selected primarily on the basis of the interview. All the evidence: test scores, high school rating, recommendations, etc., was carefully considered. Selection was made on a conference basis rather than on the basis of numerical artifacts.

No technique of selection can guarantee that all of those selected will become

outstanding scientists. It is hoped, however, that among the 40 one or two may become outstanding leaders in their sciences and that many more will make substantial contributions to science.

Science News Letter, July 25, 1942

ORDNANCE

Arms Manufacture Nothing New in India

MANUFACTURE of arms and ammunition in India is nothing new, despite present somewhat lively discussion of the industry. Arsenals at Cossipore and Ishapore, near Calcutta, have been in the gun-making business for a long time, states S. J. Hopper, former superintendent at both those places. (*Army Ordnance*, July-August.)

There was a gun factory at Fort William in Calcutta more than 150 years ago, and the establishment at Cossipore was set up just at the beginning of the 19th century, Mr. Hopper states. Prior to 1850, ordnance as heavy as 13-inch mortars and 32-pounder long guns had been cast in iron at Cossipore, besides bronze pieces in a variety of calibers.

Ordnance activities in India during the present war have included enlargement of both these establishments and intensification of the work programs there, including the training of considerable numbers of new native employees. There has also been a good deal of war-conversion of other shop facilities, especially railway construction and maintenance shops.

Products of ordnance plants in India now include field guns, machine guns and small-arms, with ammunition in great quantities; armored cars; two types of airplanes based on American models, and gas masks. Indian shipyards are turning out trawlers, mine-sweepers, lighters and similar small craft, though engines and boilers still have to be imported. An effort is now being made, however, to manufacture the propelling machinery at home.

Science News Letter, July 25, 1942

● RADIO

Saturday, August 1, 1:30 p.m., EWT
"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Drs. John O. Stewart and Newton L. Pierce, of Princeton University, will discuss Navigation in War and Peace.

Tuesday, July 28, 7:30 p.m., EWT
Science Clubs of America programs over WRUL, Boston, on 6.04, 9.70 and 11.73 megacycles.

L. B. Arguimbau, Massachusetts Institute of Technology, will discuss "Frequency Modulation." One in a series of regular periods over this short wave station to serve science clubs, particularly in the high schools, throughout the Americas. Have your science group listen in at this time.

CHEMISTRY

Rubber While You Wait Demonstrated for Congress

RUBBER while you wait was made for the benefit of the Nation's representatives in the caucus chamber of the Old House Office Building. Buna S and Butyl, the two principal types of synthetic rubber, were made, a half pound of each.

The final operation was spectacular, the mixing together of invisible gases and watery liquids and the almost instantaneous appearance of a solid white mass of raw butyl rubber.

The demonstration was staged by the Standard Oil Company of New Jersey at the request of Jennings Randolph, chairman of the Subcommittee of the Mines and Mining Committee on Production from Coal of Gasoline, Fuel Oil, Plastics, Rubber. W. S. Farish, president of the company, spoke on problems involved in the quantity production of these synthetics, after which Dr. Per K. Frohlich, Norwegian-born president of the American Chemical Society and director of the Chemical Division of the Standard Oil Development Company, carried out the demonstration with the aid of a miniature laboratory.

The rubber manufacture began with butadiene and styrene, the two principal raw materials of synthetic rubber, the one from petroleum or alcohol and the other from coal tar. A colored motion picture film showed the molecular structure of the materials and the changes that took place during the manufacture, every step of which was explained by Dr. Frohlich to the final product—synthetic rubber.

Science News Letter, July 25, 1942

AERONAUTICS

Motion Picture Theaters Aid Model Building

AIRPLANE model building, stimulated in motion picture theaters, with prizes for the best constructions and with the assurance that all the models built will be used by our armed forces, is another of the valiant contributions which the motion picture industry is making toward America's war effort.

In about two months, Paramount's new picture, "Wake Island," will be released. This picture, made in cooperation with the U. S. Marines, and starring Brian Donlevy, tells the story of the 16-day stand at Wake Island of 385 marines against everything the Japs could throw at them.

Tied up with this showing in the theaters throughout the country will be a model airplane competition. The theaters will make available to all patrons the Science Service plans for building a scale model of the Grumman F4F-3.

Prizes will be offered at the local theaters for the best models entered in the competition and all the models submitted will be sent immediately to Science Clubs of America for transfer to the First Fighter Command of the U. S. Army Forces, for use by the Ground Observer Corps.

In this way all the motion picture theaters will aid directly the drive for the model planes which our fighting forces need so badly. The appeal for these models was made by Brig. Gen. J. K. Cannon, commanding the First Fighter Command.

The theaters also will encourage young and old to try for the U. S. Army Air Force "Certificate of Award" for building a quota of four models from the seven plans which are issued free of charge to those willing and able to contribute to this war effort.

The plans for the Grumman fighting ship are not included among those issued by the First Fighter Command. Nevertheless, this Command has informed Science Service that the models completed from these plans may be substituted for either the Curtiss P-40E or the Bell P-39D which are among those officially issued.

Science News Letter, July 25, 1942

MILITARY SCIENCE

Red Cross Teaches Soldiers To Swim

THE American Red Cross is teaching American soldiers how to swim, not just for a summer afternoon's fun, but for business.

"The problems related to ship and plane transport of personnel across the seas; the use of landing and assault boats; the necessity for fighting over terrain sliced by rivers and streams—these things pointed up the fact that swimming ability was due to become an important item in troop training," Carroll L. Bryant, Assistant National Director of the Red Cross Life Saving Service, explains.

The Red Cross instructors have developed swimming methods by which soldiers, fully clothed and burdened with field and fighting equipment, can not only keep afloat but make good progress through the water.

Science News Letter, July 25, 1942

IN SCIENCE

PUBLIC HEALTH

Census Bureau Announces Lowest U. S. Death Rate

LOWEST death rate in the history of the United States death registration States was recorded in 1941, the U. S. Census Bureau announced.

Provisional mortality statistics for that year, just tabulated, show a crude death rate of 10.5 per 1,000 population. The 1940 rate was 10.8, a slight increase over the previous low level of 10.6 reached in 1938 and 1939.

There were 21,362 fewer deaths in 1941 than in 1940. Most of the decrease occurred in the rural areas. The greatest decreases were in the District of Columbia, Idaho and Vermont. Greatest increases in death rates for individual states were in Arizona and Virginia.

Total number of deaths for the entire nation for 1941 was 1,395,507.

Science News Letter, July 25, 1942

ENTOMOLOGY

Guayule in Mexico Is Attacked By Beetle

GUAYULE, one of the leading "white hopes" of the rubber situation, has a number of insect enemies, U. S. Department of Agriculture entomologists have discovered. Most destructive among them is a bark beetle that does not attack the living plants, but feeds upon the heaped-up shrubs after harvesting. Thus far it is known only from Mexico, and it may be possible to keep it out of this country by suitable quarantine regulations. In any case, this new menace to our scanty rubber supply makes it desirable to process guayule as promptly as possible after it is gathered.

The entomologists are also studying numerous other insect species that attack plants related to guayule, on the chance that they will transfer their unwelcome attentions to that plant after it has been widely established in cultivation. Among these potential enemies are root-eating white grubs (already known in guayule nurseries), wireworms, millipeds, caterpillars, grasshoppers, aphids, leafhoppers, mealybugs, and mites.

Science News Letter, July 25, 1942

NE FIELDS

CHEMISTRY

No Shortage of Magnesium For U. S. Fertilizer Needs

MAGNESIUM, though being used in enormous quantities for airplane production, is not going to be stinted to growing plants that need it, C. W. Whitaker and W. M. Ross of the U. S. Department of Agriculture have determined, after a critical survey of the fertilizer situation.

Magnesium is an absolute "must" for all green plants—their food-manufacturing green pigment, chlorophyll, cannot be formed without it. However, very little magnesium satisfies their requirement, and most soils naturally contain enough.

Where soils are short of the element, a magnesium salt must be added to the fertilizer mixture. Before the war, American needs were met with a compound known as kieserite, imported from Germany. With this cut off by blockade, we can readily meet our needs by using dolomite, a magnesium-containing limestone, where long-time results are required. Where quicker action is needed, heating the dolomite makes it more soluble and hence more readily available to plant roots.

Science News Letter, July 25, 1942

BOTANY

Vegetation on Midway Reported Very Poor

VEGETATION on Midway is certainly nothing to tempt a botanically-inclined person to seek assignment to that flar-flung outpost, even in quiet times. Botanists of the U. S. National Herbarium, with headquarters in the Smithsonian Institution, say that there are only 20 plant species native to the two scraps of dry sand that compose Midway, mostly belonging to groups found on other Pacific islands.

One reason for this is the geological youth of Midway. It is one of the most recent of small land areas to emerge above the ocean surface, hence has had little time to develop a vegetation. It is so far from other lands that about the only way plants can get there naturally is for their

seeds to be carried by long-flight birds or to drift in on ocean currents. Chances are against seeds being carried that far by the wind.

Among the scanty list of plants on Midway, however, are two that are almost unique to these islands. One is a kind of mint, the other a species of nightshade, related to potatoes and tomatoes. The nightshade species is found only on Midway and on Ocean Island, a small neighboring bit of land.

The mint once formed part of the vegetation of Laysan, a tiny, uninhabited island about a third of the way between Midway and Hawaii. With all the rest of the vegetation of Laysan, this species was wiped out by rabbits. The animals were accidentally introduced in 1903, multiplied by thousands and within ten years had nibbled away every scrap of plant life on Laysan, leaving the two square miles of its surface a sandy desert.

Two new plant species have recently been purposely introduced on Midway. They are San Francisco grass, brought in to bind and stabilize the shifting sand, and the ornamental shrub, oleander. A number of unintentional introductions were also made, when weed seeds arrived as stowaways in soil brought in by boat, so that the crew of the cable station could have a vegetable garden.

Whether there will be any further unintentional additions as a result of present intense military activities on the island is a question that cannot be answered yet. However, the Army, the Navy and above all the Marines are emphatic in the opinion that if any such weeds do come in they won't be Japanese species.

Science News Letter, July 25, 1942

MEDICINE

Grant To Hopkins For Infantile Paralysis Study

RESearch on infantile paralysis will be conducted during the coming five years at a newly established center, for the support of which a grant of \$300,000 has just been made by the National Foundation for Infantile Paralysis. The work will be headed up by Dr. Kenneth F. Maxcy, professor of epidemiology in the Johns Hopkins School of Hygiene and Public Health.

This is the largest single grant made by the Foundation since it was organized in 1938. The funds which make this and other research projects possible are contributed each year at the time of the celebration of the President's birthday.

Science News Letter, July 25, 1942

AERONAUTICS

Tough Cords of Rayon Strengthen Airplane Tires

TOUGH cords of a special type of rayon, replacing cotton, permit thinner but stronger walls, add thousands of miles to the life of the tires, and save tons of rubber from which more tires may be made for army tanks and trucks. Applied to the airplane, the lighter tires permit heavier guns and bombs to be carried, and thus increase the fighting power of the plane.

These are the claims made by E. I. du Pont de Nemours and Company in describing the new process by which they produce stronger rayon, rayon with a tensile strength of 70,000 pounds per square inch.

The increased strength, the manufacturers say, is mainly due to stretching the filament immediately after it is formed. This is similar to the cold drawing of steel which so remarkably increases its strength. Partly responsible also is the use of cellulose derived from cotton instead of from wood pulp as for ordinary rayon.

Science News Letter, July 25, 1942

NUTRITION

Factory Workers Swing To Fruit and Milk For Snacks

"VICTORY lunches" that follow food-for-freedom diet rules are now being served to war workers in the cafeterias of three major plants of the Westinghouse Electric & Manufacturing Company, Dr. Frank M. Gatto, director of health conservation, announced.

For 30 cents, workers can now get meals consisting of a liberal helping of meat, fish or eggs; vegetables; whole wheat or enriched bread; butter; and milk or a milk dessert.

The lunches are planned to provide at cost a substantial portion of the daily requirements of vitamins, minerals, sugars and starches, proteins and fats, the foods people need to keep physically fit.

Workers at the Westinghouse plants, Dr. Gatto reports, have swung to such nourishing foods as fruits and milk for mid-shift snacks. Recent surveys of the snack wagons that tour the plants show demands for oranges have tripled. From snack wagons and cafeterias come reports that Westinghouse employees are now eating 50% more green vegetables, 25% more salads, 10% more milk, and have doubled their consumption of carrots and lettuce.

Science News Letter, July 25, 1942

NUTRITION—MEDICINE

Vitamin Deficiency May Be Cause of High Blood Pressure

Pressure Rise May Occur Even Without Hardened Arteries If Vitamin Lack Interferes With Oxygen Supply

A DEFICIENCY of some of the B vitamins may be a cause of high blood pressure in some cases, it is suggested by experiments with rats reported by Dr. Royall M. Calder, of the Clayton Foundation for Research, Houston, Tex. (*Journal of Experimental Medicine*, July). If the experiments are confirmed and shown to apply to man as well as rats, the remedy for some cases might be better diet or doses of the proper vitamins.

Diets containing vitamin B₁ or thiamin, but lacking somewhat in the heat-stable vitamins of the B group, resulted in a "significant and persistent rise" in the blood pressure of the rats. This could be reversed by restoring the missing vitamins to the diet.

The explanation, Dr. Calder believes, is that lack of these vitamins blocked the action of certain enzymes needed to make oxygen available to the kidney cells.

Every cell of the body requires oxygen

in order to live and function. The cells of the kidneys may be deprived of oxygen if the arteries carrying oxygen in the blood are constricted. This is known to cause high blood pressure, and scientists believe it is the hardening of the artery walls which causes the constriction in human cases of high blood pressure. Dr. Calder believes that in some cases the high blood pressure due to lack of oxygen may occur, even when the artery walls are not hardened and constricted, as a result of failure of the cells to use the available oxygen. This failure might result from lack of vitamins or from some other condition that would make certain cells unable to use the vitamins.

No immediate human application is suggested by Dr. Calder, who presents his theory and experiments as "a working hypothesis" for further studies of the cause of high blood pressure.

Science News Letter, July 25, 1942

GENERAL SCIENCE

Draft Deferment Recommended For Science Students

OCCUPATIONAL draft deferment is recommended for students in training for certain sciences as well as for scientific men now engaged in critical war research work in an "Occupational Bulletin" being circulated by Selective Service Director Lewis B. Hershey to local draft boards and other Selective Service officials.

A list of critical occupations is included in the Bulletin. These are sciences and specialized fields certified by the National Roster of Scientific Personnel as requiring long periods of training and as being jobs for which the necessary manpower does not already exist to care for war production and activities essential to the war effort.

They are: Accountants, Chemists, Economists, Engineers (aeronautical, automotive, chemical, civil, electrical, heating, ventilating, refrigerating and air-conditioning, marine, mechanical, mining and metallurgical including mineral technologists, radio, safety and transport), Geophysicists, Industrial Managers, Mathematicians, Meteorologists, Naval Architects, Personnel Administrators, Physicists, Astronomers, Psychologists and Statisticians.

"Careful consideration for occupational classification should be given," the Bulletin says, not only for men already engaged in these activities necessary to war production or essential to the support of the war effort, but also to undergraduate college students in training for them if they are in their junior or senior years or at or near the close of the sophomore year.

A graduate or postgraduate student who is undertaking further studies for these scientific and specialized fields may be considered for occupational classification if, in addition to his studies, he is also acting as graduate assistant in a recognized college or university or is doing war research which is supervised by a federal agency.

After a student graduates, he should be given 60 days' additional deferment to give him time to get a job in war production or other war work, the Bulletin recommends.

Science News Letter, July 25, 1942

MEDICINE

Jelly For Gloves Is New Rubber-Saving Wrinkle

LATEST note on how to make rubber last as long as possible comes in an announcement (*Canadian Medical Association Journal*, July) of a new formula for a lubricating jelly for surgeons' rubber gloves, catheters and other rubber supplies.

The formula was worked out by Prof. D. E. MacKenzie, assistant professor of pharmacy in the Ontario College of Pharmacy, at the request of the Canadian Hospital Council. It calls for starch, distilled water, sodium lactate and mercuric oxycyanide.

The new jelly is needed not only because of the rubber shortage but because of the increasing shortage of gums and glycerine used previously in non-greasy lubricating jellies for rubber supplies. The new jelly which can be made in any hospital pharmacy for about 50 cents a pound, can be sterilized under steam pressure, does not deteriorate on storage, does not harm either rubber or human tissues and contains an anti-bacterial substance.

Science News Letter, July 25, 1942

More than 20 potential insect enemies of the rubber-bearing *guayule* plant are known.

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PUBLIC HEALTH

Reports Three New Outbreaks Of Eye Disease in Shipyard

Symptoms Like Those of "Pink Eye" but More Serious Keeping Workers Away From Jobs as Long as Four Weeks

THREE outbreaks of a contagious eye disease affecting nearly 600 shipyard workers at the Oregon Shipbuilding Corporation are reported by Dr. Forrest E. Rieke, of Portland, Ore., (*Journal, American Medical Association*, July 18).

The infection is believed to have come from Hawaii, where it was reported in the summer of 1941. It is "known to have been geographically distributed from Hawaii to Portland, Ore., to San Francisco to New York and way points," Dr. Rieke states.

The germ that causes the disease could not be identified but is believed to be a virus. Usually only one eye is severely effected. Symptoms were similar to "pink eye," but besides the redness, swelling, scratching and tearing, there was a speckled condition of the cornea sufficient in some cases "to markedly reduce the vision of the involved eye."

Every known form of treatment was tried "with a uniform lack of good results."

"It seemed that the workman was best cared for," Dr. Rieke states, "if he left the job, used a mild eye wash, avoided eyestrain and observed ordinary cleanliness and hygiene of the eyes."

Most of the inflammations lasted from 16 to 28 days. The speckles on the cornea gradually disappeared in the course of several months, but whether the vision will return to normal cannot be stated at present.

The first outbreak started late in October, 1941. A fresh wave of cases occurred in mid-January, 1942, and early in May more cases began to appear. A small percentage of the men exposed were infected. Although most of the men thought the condition came from some material with which they were working which had gotten into their eye, this was not the case. The disease was more prevalent among men actively engaged in building ships but was also found in the office workers, in families of the workmen and in several physicians in the Portland area.

Officials of the division of industrial hygiene of the National Institute of Health, U. S. Public Health Service, state they do not know of any outbreak of the infectious eye disease of shipyard workers on the East Coast.

The disease is not necessarily confined to shipyard workers, they state. A number of cases in California occurred among

persons having no connection with shipyard workers or their families.

Spread of the disease in shipyards, the federal health service officers believe, is due to contamination of the protective masks and goggles the workers wear.

Dr. Leonard Greenburg, director of the division of industrial hygiene, N. Y. State Department of Labor, stated in response to a long distance telephone inquiry by Science Service that a small outbreak of eye trouble in one New York plant occurred a few weeks ago. Investigation by his staff and outside medical consultants, however, showed that this was not the same as the West Coast disease, was not believed caused by a virus, was a minor disease and not of significance in connection with the West Coast outbreaks.

Science News Letter, July 25, 1942

MEDICINE

Advise Skin Tests Before Blood Plasma Transfusions

BEFORE transfusions of blood plasma are given, a skin test should be made whenever possible to avoid the danger of adverse reaction to the plasma, Dr. Milton Levine and Dr. David State, of the University of Minnesota, warn (*Science*, July 17).

The skin test is made by injecting a tiny amount of the plasma to be used into the skin of the patient's forearm. Appearance within about 10 minutes of a wheal with a surrounding area of reddened skin shows that the patient is sensitive to that plasma. A negative test, no wheal forming, means the patient may safely be given the plasma.

Typing of the patient's blood and cross-matching tests, necessary in whole blood transfusions, are generally stated to be unnecessary when plasma is used. The reason given is that pooling of the plasma from many people dilutes the various blood group substances in a single dose so that the chance of the patient getting incompatible substances is believed safely remote.

One case of near-fatal reaction to transfusion with blood plasma, however, has been reported and the Minnesota investigators state that their experience with group specific plasma (not pooled) indicates that reactions do occur. Of 109 patients tested, 20% or more were sensitive to one or more plasmas. It was

possible to transfuse nine of the sensitive patients but seven of them gave a reaction to the same plasma giving the positive skin test. The reactions included headache, difficulty in breathing, stomach pain, chills, fever and skin rash.

The substances in the plasma causing the reactions and the positive skin tests might be allergins, iso-antibodies or groups A and B substances. The Minnesota scientists believe it is the A and B substances but more work is needed to determine this.

What pooling of plasmas will do to eliminate the transfusion reactions is not known. Pooling of plasmas from bloods of incompatible groups failed to neutralize the skin-reacting substance.

Science News Letter, July 25, 1942

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From Page 53

and research work on the subject of gun erosion, torpedo motive power, the gyroscope, submarine guns, protection against submarine, torpedo and mine attack, improvement in submarine attachments, improvement and development in submarine engines, storage batteries and propulsion, airplanes and aircraft, improvement in radio installations and such other necessary work for the benefit of the Government service, including the construction, equipment and operation of a laboratory [and] the employment of scientific civilian assistants as may become necessary." Although some of the above-enumerated functions are now prosecuted in specialized laboratories under the cognizance of various Naval bureaus, much purely scientific work is done at the Naval Research Laboratory.

Prior to this time, research in the Navy, principally restricted to radio development, was performed at the Bureau of Standards under a group financed by the Navy Department, and at various other laboratories under the cognizance of the Navy Department.

During all this period from 1918 to 1941, the Navy maintained and still maintains the closest contacts with the commercial research laboratories. The fact that the Navy found itself technologically in such splendid condition at the outbreak of war in 1941 reflects great credit on industry, on the commercial research laboratories, and those of the Navy who were so eager to embody in Naval warfare the best products of industry and the products of industry's best brains.

High Pressure and High Temperature Steam

This short title covers a large and widespread development with an interesting historical background. Prior to 1933 the design of the machinery for Naval vessels was pretty much in the hands of the so-called ship and engine builders with licenses from Parsons Ltd.

You will remember that when James Watt put a condenser on the steam engine, steam engines were quite universally used for pumping mines. It was Watt's invention or development which sent the steam engine to sea and from the time of Fulton on for a great many years the scientific development in steam engineering was to be found on Naval or commercial vessels. In other words, marine engineering led the steam engineering field.



FINAL EXAMINATION

The forty winners assembled in the inspiring surroundings of the rotunda of the National Museum to take their final written examination. Here they are hard at work.

With the invention of the Parsons and the Curtis turbines, and with the beginning under Thomas A. Edison of the great central power plants for generating light and power, the situation gradually changed until the central power plant design dominated the field of steam engineering. Thus, it became apparent to those of us who were in charge of engineering design for the Navy that in our time at least, and perhaps for a long time to come, marine engineering must derive its inspiration from the central power plant. Central power plant performance was much more efficient than Naval steam plants and to effect improvements, pressures and temperature were raised to 600 pounds and 850° F.

This was one of the wisest decisions ever made because the large American turbine manufacturers with their competent research and test facilities behind them were in a position to afford splendid support to the Navy in its effort to bring its engineering more in line with the phenomenal work which had been done in the central power plants of the United States in raising pressures and temperatures due to utilizing the great progress which had been made in metallurgy in this country.

This decision naturally encountered much opposition from those who could

not realize that we had passed a big turn in the road; that intense specialization was the order of the day; that we must greatly increase the fuel efficiency of our ships, which of course, adds greatly to the cruising radius. With high pressure high temperature came high-speed turbines with much fewer blades, double-reduction gears, much improved feed-water systems, with the corresponding reduction in the oxygen content of feed water, super-heat control boilers, and many other engineering details too numerous to mention on this occasion.

Flameproof Cable

The development of flameproof cable is typical of the procedure which has happened literally thousands of times where the Navy Department goes to a group of manufacturers and asks them to create something which not only does not exist but is way beyond anything required in commerce and industry.

Multi-Engine Submarines

One of the great accomplishments of this period was the multi-engine Diesel electric drive for submarines. It has enabled us to build submarines vastly superior in performance and reliability to anything which had been produced be-

fore. It was developed by the manufacturers of the country and the Navy Department working in conjunction. One of its amazing by-products was the application of these engines to the locomotive, an application which, if my information from the newspapers is correct, has resulted in Diesel electric locomotives constituting half of the locomotives being built in this country at the present time.

Pancake Engine

Recent press releases from the Navy Department announced the arrival of the General Motors Diesel engine for subchasers, etc., described as "the lightest ocean-duty Diesel engine in the world" and the "best engine any sub-chaser ever had."

There is a very interesting story behind this announcement.

In July 1937, I went with Commander Leggett to Detroit to inspect the pencil drawings of a new lightweight Diesel engine designed by C. F. Kettering at the General Motors Laboratories. Pencil drawings, that's all—no model—nothing else. Now at that time, there was no interest in this country in patrol boats, subchasers and any of those small craft, because the present war was too far away to permit any visualization of the future by most people—in or out of the Navy.

Well, the design looked good and in spite of lack of support, I decided to proceed with the development of this engine and to get myself into the position where I could put this engine on the shelf, ready for an emergency not as yet foreseen by others.

As a result of this meeting in Detroit in early July, I put \$250,000 of the Government's money into the development of this engine which at that time existed only on paper, no model having been built. I was positive that Boss Kettering's dream was worth \$250,000.

Now, here we have a good example of the field of the commercial research laboratory in the preparation of the Navy for a future war. The building of a radically new engine, revolutionary in space requirements and in weight per horsepower, was initiated before there was any demand for it and while some skeptics were saying it would never be of any use to anyone.

Well, this unwanted baby, conceived in 1937, arrived in 1942 to help us solve a submarine menace never dreamed of in 1937. But the engineers in 1937 were confident that this en-

gine was destined to great future usefulness.

Radio Detection

Another great piece of research work, started years ago, was in radio detection. The details of this can not be told here at this time.

All work on this subject done anywhere stems from the original work of Dr. A. Hoyt Taylor. All the fundamental work done in this country must be credited to Dr. Taylor, Mr. L. C. Young, Mr. R. M. Page and other brilliant associates, all members of the Naval Research Laboratory. This Republic can never repay these geniuses for their outstanding contribution to the National Defense. Through their efforts and the efforts of other equally able men, the contributions of the Naval Research Laboratory in chemistry and underwater sound, to mention only a few subjects, together with radio detection, have repaid the Government all costs of the Laboratory to date and would finance future expenses for an almost indefinite period.

Current Research Situation

I have given you several examples to show how long it takes for the products of research to become of general use.

All the developments in connection with the modern machinery of our Naval vessels were worked out by 1939, a long time before the public ever thought we would get into this war, before the present stupendous appropriations became available, and while we were still building a one-ocean Navy.

The ground work for radio detection was well prepared, well before the outbreak of war; the fact that we are making such rapid progress in developing it to its logical conclusion, the fact that we are building so many Naval vessels so rapidly, the fact that we have pancake engines in production today is due largely to research work done long before Pearl Harbor.

The public should know that the Army and Navy have not been asleep in regard to the prospects of research during the period between the two World Wars. It is indeed fortunate that Congress foresaw the necessity for organized study of Naval problems, and that they established the Naval Research Laboratory. This Laboratory is indeed a reservoir for the accumulated scientific and technical experience of the Naval scientist so coordinated with Naval prac-

tice that the experience may be immediately applied to new and changing situations. During the past two years it has in fact been an important and experienced nucleus for the indoctrination of new investigators with the fundamental requirements of Naval research and has also provided a pool of information on the scientific aspects of many specialized Naval problems.

Of course, in time of peace there naturally is not expended the tremendous energy on any subject that is expended in time of war. Men are not available, money is not available, in like amounts, and sales resistance to new ideas is unbelievably high. It is one hundred times as hard to put over a new idea in times of peace as it is in times of war.

But the time to lay the groundwork and to standardize engines and equipment is before the time for large production arises.

The Naval Research Laboratory is required to fill a large field in research, development, and consultation in connection with production, installation and operation. We can't research a product into being, turn it over to a production activity, and then wash our hands of it. As much as we would like to, we can not devote our time exclusively to research.

On account of long contact with industry and the Navy, our scientists are accustomed to build models that, first, are reasonably susceptible to production, and second, are practical to use aboard ship. That means, of course, that the Naval Research Laboratory model doesn't have to be entirely rebuilt by the manufacturer or contractor in order to so reduce its weight or its volume

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that it can be used aboard ship, or in order to make it susceptible to modern shop methods of production. The Naval Research Laboratory not only furnishes consulting advice to the contractors in the case of its models, but for practically all models produced elsewhere.

After production, installation difficulties arise in the case of radically new and complicated installations. In this case we not only furnish consultation and do installation work, but also train installation engineers. We have had to educate and train operators and maintenance engineers. We assist in the formulation of new tactics which may have to be developed to meet realistic changes required to best embody new equipment in operation. These scientists fly in planes, cruise in surface ships, and dive in submarines.

The Naval Research Laboratory in its work has always enjoyed support from the Congress. The Naval Appropriations Committee of the House under the able chairmanship of the Honorable James G. Scrugham, has enthusiastically supported the Laboratory and supplemented its hearings by frequent and detailed inspections of the problems under way. This encouragement has been invaluable.

The work of the Army and Navy in research and inventions has lately been supplemented by the efforts of the National Defense Research Committee and the National Inventors Council. The work of the National Defense Research Committee has been widely commented on in the magazines and press and there is no necessity for further reference to it here.

The National Inventors Council handles inventions for the Army and Navy, doing in this respect for both services what the Edison (Consulting) Board did for the Navy in the last war. Its work is also well known.

The Navy has been alive to all new ideas down through the years. Of course,

if one could be definitely sure that a certain thing would happen in the future, that would permit different dispositions. No nation has ever been completely prepared for war—not even Germany, and wars are fought with what you've got, not something you wished you had.

Pancake engines, extraordinarily economical machinery, radio detectors, etc. are not pulled out of a hat. It takes a lot of work and a lot of time, and if you aren't well along with them when war breaks out—why, they don't fight in the current war.

You can be assured that this country is today by far better off technologically than it has ever been in any other war.

Science News Letter, July 25, 1942

New Machines And Gadgets

Novel Things for Wartime Living

Transportation of glassware and other fragile objects can be made safe by an ingenious new wrapping material. It is made by cutting a system of slits in stiff wrapping paper and then stretching it out into an open network. This causes the paper between slits to stand on edge, and is exactly the process by which expanded metal lath for plastering is made. One advantage over old newspapers is that the objects can be seen through the open network without unwrapping.

Blackout buttons, small nickel-sized disks of methyl methacrylate resin of high reflecting power, have a multitude of uses during blackouts. They reflect the dimmest light, showing up as though illuminated from behind. They can be worn on a belt or used to make directional signs or to indicate danger spots such as stairs, elevator shafts and the like. Each disk has a hole in the center so that it can be nailed, screwed or wired in place. Six hundred of them weight only a pound.

Dry electrically conductive paper has been invented for the purpose of telegraphically transmitting facsimiles. This was previously done with wet paper. The new paper is prepared by dipping it in an electrolyte such as ammonium nitrate dissolved in one of the higher alcohols. The paper is then dried and subjected to heat and pressure. The solvent and the electrolyte melt and form a solid solution within the paper, which is then conductive even when dry.

To reduce spoilage of war machine parts by moisture, an electronic "weatherman" has been developed which keeps continuous watch over the furnace gases used to heat-harden tough steel airplane, tank and gun parts, and detects as little as four-thousandths of one per cent water vapor in the gases. The new recorder is said to be more accurate than the long tests previously made by a skilled technician. Anyone can use it who can read a meter.

Wooden pipe replaces steel culvert. It is made of prefabricated pieces of short lengths of wood, sizes that ordinarily would be discarded. They are light, easily transported, and require no special skill to put together. Used in army camps and cantonments, the wooden pipe is expected to last the life of these projects. For permanent drainage, the usual corrugated steel pipe can be simply threaded through the wooden culvert after the war.

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N. St., N. W., Washington, D. C., and ask for Gadget Bulletin 114.

Science News Letter, July 25, 1942

Bossy herself may soon supply the lining for milk cans—a U. S. Department of Agriculture chemist has invented a lacquer made largely from lactic acid, an ingredient of milk.

Fiber from a common mallow species that grows wild in the West Indies, Central and South America, is being substituted in large quantities for East Indian jute in making bags and cord.

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PHYSIOLOGY—PSYCHOLOGY

Physical and Mental Needs Of Paratroopers Listed

Intelligence, Good Eyes and Teeth, Emotional Stability Among Requirements; Giants and Runts Alike Rejected

THE PARATROOPER needs intelligence, good eyes and teeth, and emotional stability, as well as physical strength and an athletic body, Capt. David E. Thomas, Medical Corps, U. S. Army, declares. (*Military Surgeon*, July).

"The avoidance of injury," he states, "depends on a man's ability to think fast, to learn the proper technique and to make his muscles obey his mind. The clumsy, athletically inept person is a liability. The person who permits his fear reactions to make him forget what he has learned cannot be trained successfully."

Men serving as parachutists must be between 66 and 72 inches in height and weigh between 150 and 185 pounds. Tall men have difficulty getting out of the plane door and very heavy men may blow out the panels of the parachute during the opening shock, Capt. Thomas explains. Tall, thin men have difficulty tumbling properly and smaller men, while they make easier landings, do not have the strength to handle the heavy equipment.

Good vision without eye glasses is necessary so a man may gauge his height from the ground accurately when landing. He must also be able to see equipment bundles after they land. Since some of these are dropped by colored parachutes, he must have ability to distinguish colors.

As to teeth, men with small bridges are accepted but not those who wear plates because of the possibility of breaking or losing them.

Ability to do 15 push-ups is one of the tests for physical strength. Men who have had severe injuries or frequent sprains are not acceptable because old injuries are likely to recur during training.

High school education or its equivalent and at least a Group 3 rating in the A.G.O. intelligence test scale are required to make sure the man has the initiative and ability for individual thinking required by the parachutist's duties after landing.

Those who faint at the sight of blood

or who have had epilepsy, migraine or similar nervous diseases are not accepted. Fixed standards for emotional requirements cannot be given at present, but Capt. Thomas believes these may be established after further study of soldiers who refuse the training or who volunteer for parachute duty just to find out whether or not they have the necessary courage to jump out of a plane voluntarily.

Science News Letter, July 25, 1942

NUTRITION

Food Enrichment Program Calls For New Breeds

NEW plans for a really all-out food enrichment program, in which plant and livestock breeders will aid by starting enrichment from the roots up, were called for by Dr. Hazel K. Stiebelling, nutrition authority of the U. S. Bureau of Home Economics, at the Second Inter-American Conference on Agriculture in Mexico City.

Enriching bread and flour by adding vitamins and minerals at the mill or in the bakery, hailed in the United States a year ago as a revolutionary step toward better national nutrition, is only the beginning of a real food-enrichment program, Dr. Stiebelling made clear.

"Such enrichment of grain products," she pointed out, "is largely a restoration of some of the nutrients removed in processing."

"There is another type of enrichment which has great promise of improving nutrition. This is the improvement of the nutritive value of food both through better feeding of livestock and better cultural practices with plants and through the selection of varieties of plants and breed of animals that are prized not merely for size or quantitative returns but also for exceptional nutritive value."

"To this," she declared, "agricultural planners should address themselves."

Science News Letter, July 25, 1942

YOUTH LOOKS AT SCIENCE AND WAR

What ideas do the most talented among American high school science students have about "How Science Can Help Win the War?"

Forty trip winners of the Science Talent Search (9 girls and 31 boys) have written lucid and thought-provoking essays on all aspects of war and science.

When the judges read the essays they recommended that they be made available to a wide audience. So Science Service has published them in an attractive book at a reasonable price.

These 140 pages of well-printed text of "Youth Looks at Science and War" also contain the text of the science aptitude examination that each contesting high school senior had to take in order to enter the Science Talent Search.

Adults need not fear they will be shamed by the youngsters about them because the correct answers are given in this book. (Not one contestant out of the 3,200 completing the test got the 100 score.)

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•First Glances at New Books

CHEMICAL WARFARE

WAR GASES, Their Identification and Decontamination — Morris B. Jacobs — *Interscience Publishers*, 180 p., \$3. This book is written in the interests of civilian defense against poison gas, for the instruction of air raid wardens, health officers, and all others who may be called upon to take part in such defense.

Science News Letter, July 25, 1942

TECHNOLOGY

PLASTICS—J. H. DuBois—*Amer. Technical Soc.*, 295 p., illus., \$3. Concise information concerning all the important plastics makes this work useful either as an introductory textbook or as reference book, both for those working in the field or for those merely interested.

Science News Letter, July 25, 1942

CHEMISTRY—TECHNOLOGY

EXTRACTION OF RUBBER FROM PLANTS—Muriel E. Whalley—*National Research Council of Canada*, 19 p., 25 c. Chief attention is paid to the Canadian milkweed, but goldenrod, guayule, and the Russian kok-saghyz are also given brief treatment. The information is collected from published sources and patents.

Science News Letter, July 25, 1942

RADIO

FUNDAMENTALS OF RADIO—Edward C. Jordan and others; W. L. Everitt, ed.—*Prentice-Hall*, 400 p., \$5 trade; \$3.75 school. A basic text for training technicians for the armed forces, for industry and for broadcasting, based on the course outline recommended by the National Association of Broadcasters. No mathematics beyond elementary algebra is required, but the foundations are laid for more advanced study.

Science News Letter, July 25, 1942

ENGINEERING

INDUSTRIAL CAMOUFLAGE MANUAL — Konrad F. Wittmann in collaboration with Pratt Institute faculty — *Reinhold Pub. Corp.*, 128 p., illus., \$4. A handbook for industrialists who have factories to hide. Problems and methods of solution are graphically presented. Illustrations, quite properly, fill the greater part of the pages.

Science News Letter, July 25, 1942

ECONOMICS—NATIONAL DEFENSE

AUTOMOBILE TRANSPORTATION IN THE WAR EFFORT — Charles L. Dearing — *Brookings Institution*, 47 p., 25c. How to keep the automotive wheels turning for essential wartime transportation, is the subject of this timely booklet.

Science News Letter, July 25, 1942

REFERENCE

AN INDEX TO INDEXES, A Subject Bibliography of Published Indexes — Norma Olin Ireland — *Faxon*, 107 p., \$1.75. Valuable for research workers and librarians, this volume tells where to look for references.

Science News Letter, July 25, 1942

● Just Off the Press ●

AEROPLANE RADIO EQUIPMENT—E. Molloy and E. W. Knott, eds.—*Chem. Pub. Co.*, 132 p., illus., \$2.50.

AIR NAVIGATION—E. Molloy, ed.—*Chem. Pub. Co.*, Part I, 128 p., illus.; Part II, 132 p., illus., \$2.50.

AIRCRAFT MATHEMATICS—S. A. Walling and J. C. Hill—*Cambridge (Macmillan)*, 189 p., \$1.25.

AMERICAN RED CROSS TEXTBOOK ON RED CROSS HOME NURSING—Lona L. Trotter—*Blakiston*, 431 p., 60 c.

ANALYTIC GEOMETRY—Charles H. Lehmann—*Wiley*, 425 p., \$3.75.

CHEMICAL REFINING OF PETROLEUM (Rev. ed.)—Vladimir A. Kalichevsky and Bert Allen Stagner—*Reinhold Pub. Corp.*, 550 p., \$7.50.

THE DIFFUSION OF SCIENCE—Jesse Lee Bennett—*Johns Hopkins Press*, 141 p., \$2.25.

ECOLOGICAL CROP GEOGRAPHY—Karl H. W. Klages—*Macmillan*, 615 p., \$4.50.

ENGINEERING SURVEYS: Elementary and Applied—Harry Rubey, George Edward Lommel and Marion Wesley Todd—*Macmillan*, 834 p., illus., \$4.50.

A FIELD GUIDE TO THE BIRDS OF EASTERN WASHINGTON, EASTERN OREGON AND IDAHO—Ernest S. Booth—*Pub. by Author*, Walla Walla College, College Place, Washington, 43 p., illus., 50 c.

THE LINK TRAINER—E. Molloy and E. W. Knott, eds. *Chem. Pub. Co.*, 132 p., illus., \$2.50.

PHYSICAL CHEMISTRY FOR STUDENTS OF BIOCHEMISTRY AND MEDICINE—Edward Staunton West—*Macmillan*, 368 p., \$5.75.

PHYSICAL SCIENCE—William F. Ehret, Leslie E. Spock, Jr., Walter A. Schneider, Carel W. van der Merwe and Howard E. Wahlert—*Macmillan*, 639 p., illus., \$3.90.

PHYSIOLOGICAL HYGIENE (Rev. ed.)—Cleveland Pendleton Hickman—*Prentice-Hall*, 482 p., \$3.25.

THE SEASHORE PARADE—Murial Lewin Guberlet; Illus. by Jan Ogden—*Jaques Cattell Press*, 197 p., illus., \$1.75.

SHORT-WAVE MANUAL—F. J. Camm, ed.—*Chem. Pub. Co.*, 213 p., illus., \$2.50.

THE STEEL SQUARE, Showing its Application to Roofing, Timber Framing and Staircasing—Noel D. Green—*Chem. Pub. Co.*, 88 p., illus., \$2.50.

THE SUPERHET MANUAL—F. J. Camm, ed.—*Chem. Pub. Co.*, 135 p., diagrs., \$2.50.

WIRELESS COILS, CHOKES AND TRANSFORMERS—F. J. Camm, ed.—*Chem. Pub. Co.*, 180 p., illus., \$2.50.

X-RAY CRYSTALLOGRAPHY: An Introduction to the Investigation of Crystals by Their Diffraction of Monochromatic X-Radiation—M. J. Buerger—*Wiley*, 531 p., \$6.50.

ARCHAEOLOGY—ART

DIONYSIAC SARCOPHAGI IN BALTIMORE — Karl Lehmann-Hartleben and Erling C. Olsen—*Institute of Fine Arts, New York Univ. and Walters Art Gallery, Baltimore*, 81 p., illus., \$1.50. A beautifully published and illustrated description of a group of Roman sarcophagi of the second and third centuries A. D. Delicate carvings in relief depicting ancient myths are archaeologically important and artistically interesting.

Science News Letter, July 25, 1942

GEOGRAPHY

PHYSICAL ELEMENTS OF GEOGRAPHY — Verner C. Finch and Glenn T. Trevartha — *McGraw-Hill*, 641 p., illus., \$3.50. A competently prepared textbook in physical geography, with a dynamic approach. Special attention is given to climates and soils.

Science News Letter, July 25, 1942

ECOLOGY—GEOGRAPHY

ECOLOGICAL CROP GEOGRAPHY — Karl H. W. Klages—*Macmillan*, 615 p., \$4.50. A careful application of ecological principles to regional agronomy. Four main avenues of approach to the problems are used: social environment, physiological environment, ecological factors, geographical distribution.

Science News Letter, July 25, 1942

NAVIGATION—METEOROLOGY

NAVIGATION AND METEOROLOGY — D. Hay Surgeoner—*Longmans, Green*, 108 p., \$1.25. A compact, practical handbook intended primarily for aviators. There are nine chapters on navigation, one on meteorology.

Science News Letter, July 25, 1942

ENTOMOLOGY

AMERICAN BUTTERFLIES AND MOTHS—Cecile Hulse Matschat; Illus. by Rudolf Freund—*Random House*, 70 p., illus., \$1. A beautiful book, with colored illustrations, and at a surprisingly low price. Recommended especially for young collectors.

Science News Letter, July 25, 1942

NAVAL SCIENCE

HOW TO ABANDON SHIP—Phil Richards and John J. Banigan—*Cornell Maritime Press*, 152 p., \$1. A little book on a grim subject; no attempt is made to render it "pretty". In these days every seafaring man, from skipper to cabin boy, will do well to master the contents—and remember them in time of emergency.

Science News Letter, July 25, 1942